

CHAPTER 7.0

MONITORING

*The work of science is to substitute facts for appearances,
and demonstrations for impressions.*

John Ruskin

In the previous chapter, we discussed Maine's strategy for conserving SGCN species and the five program components that implement those strategies (Figure 17). In short, Maine's approach is built on a foundation of landscape habitat conservation, which is designed to ensure that adequate habitat remains available in perpetuity to support not only Maine's SGCN, but the full array of wildlife occurring in Maine (Figure 20). Supported on that foundation are two conservation pillars: 1) species-specific population conservation, and 2) species-specific habitat conservation.

Implementation of all SGCN conservation efforts will be via five program components discussed throughout this Strategy:

- Surveys and Monitoring,
- Research,
- Population Management,
- Habitat Conservation, and
- Education and Outreach

In this chapter, we make frequent reference to our process for conserving Species of Greatest Conservation Need in Maine depicted in Figure 17. It will be helpful for the reader to have this figure handy when reviewing this chapter. We discuss how we will monitor our success by addressing each conservation strategy as follows:

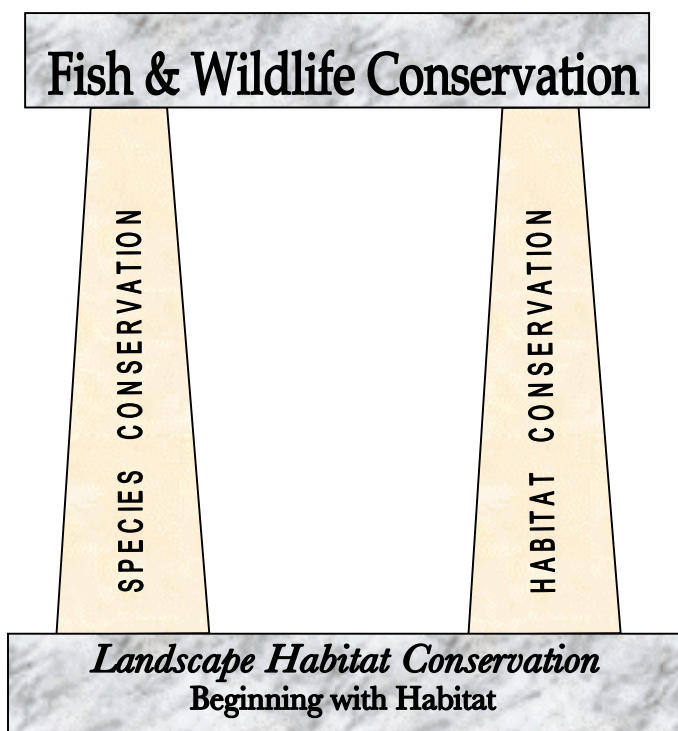
1. Monitoring SGCN species-specific population conservation,
2. Monitoring SGCN species-specific habitat conservation, and
3. Monitoring landscape habitat conservation for SGCN species

7.1 MONITORING SPECIES-SPECIFIC POPULATION CONSERVATION

SGCN species run the gamut from species for which we have little information, to those that have been shepherded through our species planning process and are being monitored and managed according to the dictates of a formal management system (Chapter 6.2, Figure 17). Although we emphasize the planning process, we also work closely with federal, state, and private conservation partners to develop and participate in cooperative species monitoring programs, which helps us keep track of populations of SGCN that will not be part of the species planning process in the foreseeable future.

In this section, we discuss monitoring SGCN species-specific population conservation based on each species status in the planning process (Chapter 6.2, Figure 17).

Figure 20. Foundation and Pillars that Support Fish and wildlife conservation in Maine.



7.1.1 SGCN COVERED BY A MANAGEMENT SYSTEM (Box 3 of Figure 17)

Currently, 90 SGCN are covered by species assessments and 72 SGCN are covered by management systems (Tables 40, 41, and 44). Management systems specify how progress toward population, habitat, and other publicly derived goals and objectives will be measured, and clearly defines adaptive management actions that will be implemented to ensure progress

toward management goals and objectives. An example of how a management system works [Grassland Passerines (Hodgman 2005)] can be found in Appendix 11.

Several management objectives were established for grassland Passerines, including two population objectives.

Population Objective 1: Identify grassland Passerines whose populations are declining in Maine and stabilize and begin to reverse the decline by 2017. Priority should be given to those species that have greater than 5% of their global populations breeding in Maine.

Population Objective 2: Through 2017, maintain and monitor grassland Passerines whose populations have been stable or increasing since 1980.

To address these two objectives, a section of the *Grassland Passerine Management System* focuses on population management, of which the following is an excerpt (Hodgman 2005).

POPULATION MANAGEMENT SYSTEM

Decision Criteria

The following criteria determine the sequence of procedures used to conserve grassland Passerine populations in Maine (Fig. 1). Although this system applies to all species described above, it operates on an individual species basis (i.e., each species is to be run through each population criterion separately). Furthermore, this approach is to be carried out in the form of an annual review, because of the dynamic nature of species priority/special concern lists, population trend estimates, etc.

Criterion A: *Have all species been reviewed for priority status?*

This criterion addresses whether each of the 7 species addressed by this system has been reviewed by this agency to determine the relative urgency of conservation action. The Passerine Working Group simply recommended using a threshold of 5% of global population breeding in Maine as one criterion for prioritization. However, various organizations and agencies since the 1980s have developed, sometimes elaborate, ranking systems to focus attention on certain species (NESWDTC 1999, Carter et al. 2000). These lists of priority birds, in addition to the 5% threshold, are the source of "data" to respond to this criterion.

Rule of Thumb: Species will be considered a priority, and thus addressed by this management system, if upon annual review:

1. They are recognized by Partners in Flight (PIF) as priority birds in categories IA, IB, IIA, IIB, and IIC for either the Northern Spruce- Hardwood Forest (Rosenberg and Hodgman 2000), Northern New England (Hodgman and Rosenberg 2000), or Southern New England (Dettmers and Rosenberg 2000) Physiographic Regions, or,
2. They are listed as a priority within Bird Conservation Regions (BCR) 14 or 30 by the North American Bird Conservation Initiative, or,
3. They are listed by the U.S. Fish & Wildlife Service (USFWS) as a species of management concern, or,

4. They are listed by the Northeast Endangered Species and Wildlife Diversity Technical Committee as a species of conservation concern (NESWDTC 1999). or,
5. They are considered by MDIFW to be a species of special concern, or if,
6. >5% of their global population occurs in Maine.

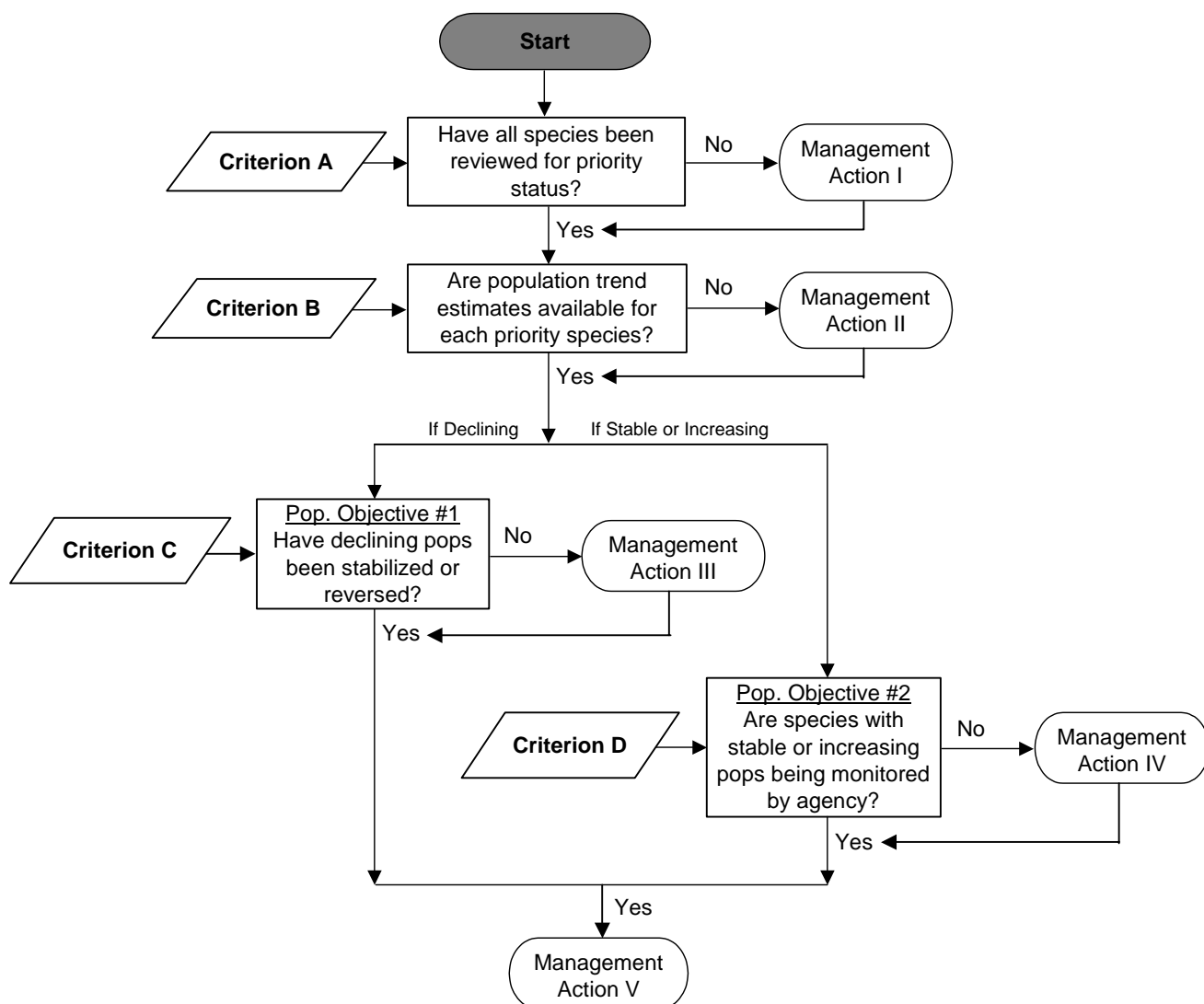


Figure 1. Flow diagram depicting decision criteria for Population Management System for grassland Passerines in Maine.

An affirmative response will require that all appropriate prioritization lists (see "Rule of Thumb" above) and population data have been reviewed (annually) to determine if any of the species in this group qualify. A list of these species will be prepared annually.

Criterion B: *Are population trend estimates available for each priority species?*

This criterion addresses the adequacy of current monitoring programs in Maine. Currently, the North American Breeding Bird Survey (BBS) provides the only reliable data and trend estimates for Passerines breeding in Maine. Also, National Audubon's Christmas Bird Count (CBC) provides data and trend estimates for winter residents.

An affirmative response will require statistically reliable trend estimates based on BBS and/or CBC data.

Rules of Thumb: If species trend estimates are only available from the BBS:

1. Trend will be based on at least 14 routes in Maine with $P \leq 0.10$ from the most recent half of the BBS period (i.e., currently 1980-2003). If <14 routes are available for Maine in that time period, use trend estimates (same P -value and time frame) for Northern New England or Eastern Spruce/Hardwood regions (switch this to BCR 14 or 30 when available) if based on ≥ 30 routes for either region.
2. *If species trend estimates are only available from the CBC:* trend will be based on ≥ 10 circles for Maine.
3. *If species trend estimates are available from both BBS and the CBC:* use estimate with greatest power according to geographic rule described above.
4. Trends not conforming to one of these rules of thumb are not reliable.

Rule of Thumb: A declining trend is a statistically significant ($P < 0.10$) estimate of negative (-) population change.

Criterion C: *For species with declining populations, have declines been stabilized or reversed?*

This criterion addresses whether species with documented declines are no longer in decline. Trend estimates from the BBS and CBC will be the primary sources of data for this criterion.

An affirmative response will require statistically reliable trend estimates.

Rule of Thumb: Populations have stabilized when a species' declining trend ceases to be significant (i.e., $P > 0.10$) for three consecutive yearly updates to either the BBS or CBC. However, estimates must have been based on at least 14 routes or 10 CBC circles (or 30 routes for Northern New England or Eastern Spruce Hardwood regions when Maine data are unreliable) for 3 consecutive years. Population declines have reversed (i.e., increasing) when a species' declining trend (or nonsignificant trend) becomes positive (+) and is significant at $P < 0.10$ for three consecutive yearly updates to either the BBS or CBC. Estimates must be based on at least 14 routes (10 CBC circles) for Maine, or if Maine data are insufficient, 30 routes for Northern New England or Eastern Spruce Hardwood regions.

Criterion D: *Are species with stable or increasing populations being monitored by agency?*

This criterion addresses whether populations of any of the 7 species covered by this management system are stable or increasing and are considered a priority under Criterion A. Further, it asks if these populations are being monitored by MDIFW Staff or its volunteers or partner organizations or agencies. Sources of data for this criterion arise from the North American Breeding Bird Survey (BBS), the Christmas Bird Count (CBC) or local monitoring programs. Trend estimates from these programs provide the data to evaluate this criterion.

An affirmative response will require statistically reliable trend estimates (see "Rule of Thumb" under Criterion B) based on BBS, CBC, or other data.

Rule of Thumb: A stable trend is an estimate of population growth that is either positive (+) or negative (-), but not statistically significant (i.e., $P > 0.10$). An increasing trend is one where population growth is positive (+) and statistically significant (i.e., $P > 0.10$). Note: adequate data (number of routes or circles) are critical to making these judgments, so the "Rule of Thumb" under Criterion B must be followed closely.

Management Actions

The following management actions are the recommended procedures for accomplishing population objectives. Specific management actions result from responses to decision criteria identified in Figure 1.

Management Action I

1. Annually, determine if any species covered by this management system meet priority criteria listed in "Rule of Thumb" under Criterion A.
2. Prepare list of species that will be considered a priority for this management system.

Management Action II

1. If possible, improve BBS coverage by:
 - Enlisting new volunteers and encouraging long-term commitments.
 - Increasing participation among currently assigned routes to $\geq 90\%$, or at least 63 of 70 routes run, each year. Participation has declined steadily over the past several years: 1995 (90% of available routes were run), 1996 (100%), 1997 (80%), 1998 (82%), 1999 (70%), 2000 (58%), 2001 (57%), 2002 (49%), and 2003 (41%). Accomplish this via:
 - Sending a letter to all observers thanking them for their volunteer participation and explaining the importance of BBS data to monitoring species populations.
 - Making a follow up phone call to volunteers who have not run their assigned route two or more times since 1997. Encourage these individuals to resume survey or relinquish route to another interested individual.
 - If possible, increase total number of routes available in Maine. This is not likely for the foreseeable future as the number of routes was recently increased (to 70 routes) for the 2002 survey.
2. If priority species is only a winter resident, encourage increased participation in CBC by:
 - Determining levels of participation in each Maine circle.
 - Working to increase participation in circles with few volunteers especially in remote areas.

- Ensuring that data from all circles are submitted for analysis by contacting delinquent compilers (if any).
 - Identifying areas that can support additional circles.
 - Identifying individuals that can serve as “new” compilers.
 - Working with local NGO's to generate volunteers to count in “new” circles.
3. Develop separate monitoring programs for species not adequately monitored by the BBS or CBC if they are recognized as a priority under Criterion A. This will require additional volunteer support and may be coordinated with Maine Audubon.
 4. If unsuccessful, or deemed to have too little power to detect trends using BBS at state scale, build partnerships in northeast region to:
 - Expand BBS coverage using above-mentioned steps, and/or
 - Develop regional monitoring program specifically targeting poorly monitored species (e.g. Project Mountain Birdwatch).

Management Action III

1. Determine factors contributing to population decline
2. Differentiate between factors that can be affected in Maine and those that cannot.
3. For habitat-related factors, establish partnerships to improve habitat for declining species by:
 - Identifying stakeholders.
 - Seeking consensus among experts regarding highest priority approaches to recovery.
 - Referring to the Habitat Management System.

Management Action IV

1. Review BBS and CBC trend estimates for all priority species.
2. List each priority species with either reliable nonsignificant trends or significant positive trends.
3. Monitor trend estimates annually.
4. Develop monitoring program for species inadequately monitored by existing programs, but assumed to be stable or increasing.

Management Action V

Reconvene public working group to revise population objectives for priority species.

Some management systems have been implemented, while others are quite new or are in need of funding to initiate monitoring and management actions (Boxes 6-10 and 14 of Figure 17). Some management systems will be updated when new management goals and objectives are established. For species with fully implemented management systems, monitoring and management will be based on the management system. For species that have management systems that have not been fully implemented, our focus will be on procuring the resources to fully implement them.

7.1.2 SGCN WITH AN ASSESSMENT AND APPROVED MANAGEMENT GOALS AND OBJECTIVES, BUT NO MANAGEMENT SYSTEM
(Table 19, Box 3 of Figure 17)

Ten SGCN fall into this category, including Atlantic Puffin, Razorbill, Golden Eagle, Least Tern, Peregrine Falcon, Purple Martin, Barn Swallow, Red-necked Phalarope, Blanding's Turtle, and Spotted Turtle. A management system that covers the Purple Martin and Barn Swallow is currently being written, and will be completed by the end of 2005. Development and implementation of management systems for the other species will be a high priority.

7.1.3 SGCN WITH AN ASSESSMENT BUT NO APPROVED MANAGEMENT GOALS AND OBJECTIVES
(Table 19, Box 2 of Figure 17)

There are eight species that fall into this category. Public working groups will be convened during late 2005 to establish management goals and objectives for the New England cottontail, Arctic Tern, Common Tern, and Roseate Tern. Species assessments for the Upland Sandpiper, Grasshopper Sparrow, and Northern black racer need minor updates before a public working group is convened to address these 3 grassland species, and another public working group will be convened for the eastern box turtle, probably in conjunction with an update of the Blanding's and spotted turtles assessments. The Barrow's Goldeneye already has management goals and objectives but they are in the process of being updated. We will convene public working groups for this species in late 2005 or early 2006.

7.1.4 SGCN WITH NO ASSESSMENT, BUT KNOWLEDGE ABOUT THE SPECIES IS SUFFICIENT TO DEVELOP AN ASSESSMENT
(Table 43, Box 1 of Figure 17)

For these species, we will seek opportunities to develop assessments for multiple species. We will not be able to work on all of these species simultaneously, so we will develop assessments by priority as resources and opportunities become available. In the interim, we will work to ensure populations of these species are monitored on a regular basis (Box 11 of Figure 17); research is designed and conducted to collect data needed to implement effective management programs (Box 12 of Figure 17); education and outreach efforts are implemented to address the public's lack of understanding of the needs and requirements of SGCN and the threats to SGCN and their habitats (Box 13 of Figure 17); and ensure landscape level habitat conservation initiatives are adequate to meet species needs. (Box 14 of Figure 17).

7.1.5 SGCN WITH NO ASSESSMENT, AND KNOWLEDGE ABOUT THE SPECIES IS INADEQUATE TO DEVELOP AN ASSESSMENT
(Box 1 of Figure 17)

Our actions on these species will depend on the reason for the lack of adequate information (Chapter 5, Tables 30-35). For some species, we will collect data on their population status, distribution, and trends (Box 11 of Figure 17). For other species, we will design and conduct research to address specific and basic questions about the biology of the species (Box 12 of

Figure 17), and for some we will address all these information needs (Boxes 11-13 of Figure 17). Until we have the resources to conduct the needed research and surveys, we will attempt to ensure these species are covered under one of several ongoing monitoring programs (Tables 43 and 44), or seek opportunities to work with conservation partners and develop efficient monitoring strategies for species not covered by current monitoring programs.

Some SGCN, such as the wolf, are currently listed as Extirpated in Maine, but the possibility exists they may be present or may return to Maine. For other SGCN, we have little knowledge of their distribution and abundance (Chapter 5, Tables 30-35). Through ecoregional surveys and species-specific surveys, we will continue to try and determine the presence, abundance, and distribution of these species (Box 11 of Figure 17). Although information gathered by these surveys is critical to our understanding of the species, we do not consider these surveys to be true monitoring programs.

7.1.6 STATUS OF POPULATION MONITORING FOR MAINE'S SGCN

Birds: Examination of Table 44 reveals that most species currently monitored in Maine are birds, and most of those monitoring programs are federally supported (Table 43). The SGCN bird species currently not being monitored, at least at the state or regional level, include the Greater Shearwater, Bonaparte's Gull, Pied-billed Grebe, American Bittern, American Coot, Common Moorhen, Least Bittern, Marsh Wren, Sedge Wren, Yellow Rail, Eastern Screech Owl, American Three-toed Woodpecker, Long-eared Owl, Upland Sandpiper, American Pipit, Common Nighthawk, Whip-poor-will, and Short-eared Owl. We will attempt to develop monitoring programs for these species until they become part of a management system (Box 11 of Figure 17).

The Greater Shearwater is a non-breeding visitor to Maine during March – August, where it remains well out to sea. It will require a special effort to monitor this species. Currently, the USFWS is testing a ship-based monitoring method (e.g. whale watch tour boats) for this species.

To monitor marshland species, such as the American Bittern, American Coot, Common Moorhen, Least Bittern, Marsh Wren, Pied-billed Grebe, Sedge Wren, and Yellow Rail, MDIFW will continue to work closely with other states in the Northeast, the USFWS, and private conservation partners to implement a regional marshbird inventory. Monitoring will be based on a nationally accepted protocol for monitoring these species that has been developed, peer-reviewed, and is being conducted on national wildlife refuges in various states in the Northeast. Monitoring at the regional scale, with adequate numbers of wetlands surveyed within each state, will be needed to implement effective conservation strategies for this group of birds.

Nightjars, such as the Whip-poor-will, Common Nighthawk, and Chuck-will's-widow are widely distributed across the Northeast region. These species are primarily crepuscular, so consequently they are poorly detected during the Breeding Bird Survey or Christmas Bird Count. Coordinated, region-wide monitoring of nightjars would allow biologists to document population trends and also identify areas that support relatively high densities of some species, thus assisting with local conservation planning and identifying sites where in-depth habitat studies could be conducted. Methods for monitoring nightjars are currently being tested in at least five northeastern states. These efforts suggest that nightjar monitoring is feasible at a regional scale, but that coordination is greatly needed.

The Upland Sandpiper can be monitored, and a monitoring technique will be part of the management system for this species.

The American Pipit is found at one site on Mt. Katahdin in Baxter State Park (McCollough et al. 2003). Because of habitat location and sensitivity issues, this species will be very difficult to monitor.

The Bonaparte's gull will not be monitored until a breeding population is found.

The Eastern Screech Owl, American Three-toed Woodpecker, Long-eared Owl, and Short-eared Owl occur at such low numbers that a substantial effort will be needed to monitor these species.

Table 43. Current, Ongoing Bird Monitoring Programs in Maine.

Monitoring Program	Reference
North American Breeding Bird Survey	Sauer et al. 2005
Christmas Bird Count	Sauer et al. 1996
Maine Audubon Annual Loon Count	Maine Audubon coordinates roughly 1,000 volunteers who dedicate the morning of the third Saturday in July to finding and counting loons on selected bodies of water in Maine (http://www.maineaudubon.org/conserve/citsci/loon2.shtml)
Maine Coastal Waterbird Survey	MDIFW staff in cooperation with USFWS initiated a series of aerial surveys of coastal Waterbirds along the entire coast of Maine. Aerial surveys are conducted over several seasons and are supplemented with on-the-ground boat surveys. It is designed to cover each area of the coast every five years.
Maine Owl Survey	Hodgman 2004
Maine Colonial Waterbird Survey	USFWS unpublished data
Migratory Shorebird Survey (PRISM)	The Program for Regional and International Shorebird Monitoring (PRISM) is being implemented by a Canada/US Shorebird Working Group and the U. S. Shorebird Council (Bart et al. 2002) and is based on the Canadian and U. S. shorebird conservation plans (Brown et al. 2001, Donaldson et al. 2001). MDIFW is a participant in this monitoring program (Tudor 2002)
Maine Waterfowl Brood Count	This survey is conducted annually by MDIFW and is used as an index of the size of the breeding waterfowl population found in 36 wetlands (Corr 1988)
Maine Mid-winter Waterfowl Inventory	This is an aerial inventory conducted annually by MDIFW during the first week of January. It is an index to the total number of waterfowl present in Maine each winter (Corr 1988).

Table 43. Current, Ongoing Bird Monitoring Programs in Maine.

Monitoring Program	Reference
Mountain Birdwatch	The Vermont Institute of Natural Science (VINS) launched Mountain Birdwatch in the spring of 2000 to establish a monitoring program for Bicknell's Thrush and other montane forest birds. Results from this program are used to measure population trends, monitor changes in bird distribution, model potential breeding habitat, identify conservation opportunities, evaluate proposed development, and predict effects of climate change on mountain songbirds.

Herpetofauna: There are no monitoring programs for SGCN reptiles except for those covered by a management system (Box 11 of Figure 17) (Table 44). However, occurrence and distribution data continue to be collected in Maine as part of the *Maine Amphibian and Reptile Atlas Project* (MARAP) (Hunter et al. 1999). These data may be adequate to detect changes in presence or absence at the township scale, but the quality of the data is insufficient to monitor population trends. The secretive nature of many reptiles makes the design and implementation of a monitoring program for these species very difficult.

Occurrence and distribution data on SGCN amphibians continue to be collected and maintained in a database as part of MARAP (Hunter et al. 1999) (Box 11 of Figure 17). As for reptiles, these data may be adequate to detect changes in presence or absence at the township scale, but the quality of the data is inadequate to monitor population trends. However, there is a monitoring program for frogs and toads [Maine Amphibian Monitoring Project (MAMP)]. This citizen-scientist initiative is part of a nationwide survey organized by the U. S. Geological Survey, but none of the monitored species are SGCN species, although some are Priority 3 species (Chapter 3, Table 11)(deMaynadier 2004).

Invertebrates: There are essentially no monitoring programs for invertebrates other than those covered by a management system (Table 44), but there are several survey efforts in place that have the potential of being developed into monitoring programs. The ecoregional surveys (Chapter 11, Appendix 13), which are designed to gather occurrence and distribution data, include surveys of SGCN, but these surveys have been one-time efforts thus far. They could, however, be repeated periodically so that changes in the presence and absence of selected species and their distribution could be detected. The Maine Dragonfly and Damselfly Survey (MDDS) is a citizen scientist atlas project designed to collect data on the distribution, status, and habitat relationships of these species (deMaynadier 2004), and a similar effort is being developed for Maine's butterflies (deMaynadier 2004, Webster and deMaynadier 2005), but these surveys are not designed to monitor population trends for these species. We intend to investigate the feasibility of monitoring individual, high priority invertebrates, or groups of priority invertebrates, as part of our conservation plan (Box 11 of Figure 17).

Inland Fish: Monitoring programs for all 12 inland fish SGCN are covered by one statewide, management system (Appendix 11), and all are also addressed within 17 management plans listed below. The Brook Trout Management Plan is provided as a representative example (Appendix 11).

- Arctic Charr Management Plan
- Black Bass Management Plan
- Brook Trout Management Plan
- Brown Trout Management Plan
- Burbot (Cusk) Management Plan
- Lake Trout Management Plan
- Landlocked Salmon Management Plan
- Minor Sportfish Management Plan
- Muskellunge Management Plan
- Non-Sport and Commercial Management Plan
- Pickerel Management Plan
- Northern Pike Management Plan
- Rainbow Trout Management Plan
- Smelt Management Plan
- Splake Management Plan
- White Perch Plan
- Whitefish Management Plan

Of the 12 SGCN inland fish, the status of four species (brook trout, lake trout, landlocked salmon, and rainbow smelt) is regularly monitored through a variety of survey techniques including netting, electrofishing, water quality analysis, and habitat measurements, among others (Table 44). Arctic charr are also subject to regular, though less frequent, observations. Systematic monitoring of another species, the lake whitefish, has recently been initiated. Monitoring efforts for the remaining SGCN are primarily incidental to those observations made on brook trout, lake trout, landlocked salmon and rainbow smelt.

Mammals: There are no current monitoring programs for SGCN mammalian species (Box 11 of Figure 17). The eastern small-footed myotis is included in the ecoregional surveys (Chapter 11) and hibernacula are examined as we hear of them. The New England cottontail was recently surveyed in Maine, and the distribution and a population estimate were determined by Litvaitis and Johnson (2002). A monitoring protocol was also developed (Litvaitis and Johnson 2002, Litvaitis et al. 2003) and will probably be implemented when a management system is written for the New England cottontail sometime in 2006.

The northern bog lemming, rock (yellow-nosed) vole, and wolf are all being surveyed as part of the ecoregional survey effort (Chapter 11). Reported sightings, tracks, howling, etc. of large canids are followed-up by conservation partners and by MDIFW in accordance with established protocol (Matula and McLaughlin 2001). An intensive radiotelemetry study of Canada lynx was initiated in 1999 by MDIFW, USFWS, and several partners, and continues to the present. Also, lynx are surveyed as part of the ecoregional survey effort (Chapter 11).

Marine: The *Cooperative Management Plan for Large Whales and Sea Turtles in the State of Maine* (Stockwell 2004) (Appendix 10) includes whale monitoring components in the form of a voluntary sightings network and a whale sightings web page. The Voluntary Sightings Network is comprised of members of the Maine commercial fishing industry, Maine Marine Patrol (MMP), whale watch vessels, and other mariners (ship pilots, ferry captains, tugboat pilots, recreational boaters, and sailors). All large whale sightings can be reported to the Maine Whale Plan Coordinator using the upgraded statewide toll free Maine Marine Animal Reporting Hotline, 1-800-532-9551. Once verified, whale sightings are entered into a web-based GIS application by staff at the Department of Marine Resources in West Boothbay Harbor and are immediately available for public viewing on the Maine Whale Sightings web page

<http://www.maine.gov/dmr/rm/whale/whalesighting.htm>. Level I Responders (including trained lobstermen, Marine Patrol officers, and whale watches) are available coast-wide to verify sightings or provide stand-by assistance in the event of an entangled animal.

Responses to verified sightings are determined by the nature of the event. Calls are routed by the Whale Plan Coordinator to appropriate parties (NOAA/NMFS, PCCS, N E Aquarium, U.S. Coast Guard, MMP). Whale sightings protocol has been refined through discussions with MMP, industry, and NOAA/NMFS. A sightings reporting form documents each sighting for archive files.

The web-based, interactive ArcGIS program allows the DMR to monitor and make available real-time sightings data of large whale distributions in Maine waters. Though currently uncorrected for effort, the website incorporates historical sightings data of all large whales as well as data generated daily by the Maine Sightings Network. The purpose of the program is to inform fishermen when whales are in areas that are being fished in order to take precautionary measures (i.e. keep a sharper look-out for whale-gear interaction, choose not to move new gear into the area until the whales have moved out, or choose to move gear out of the way). The GIS program can also be used to generate faxed, phoned, and emailed reports to industry members, buying stations, or other Network members who do not have access to the Web.

The Atlantic Salmon Commission (MASC) conducts routine monitoring of the abundance and status of juvenile and adult salmon in most of Maine's Atlantic salmon watersheds. MASC operates traps to monitor adult Atlantic salmon returns on the Penobscot, Narraguagus, Pleasant, and Dennys Rivers. Great Lakes Hydro, America operates a trap in the upper Penobscot drainage, Pennsylvania Power and Light operates one on the Union River, Florida Power and Light operates traps and lifts on the Saco River, MDMR operates a trap on the Androscoggin River, and the St. Croix Waterway Commission operates one on the St. Croix. Redd counts are used to track spawning escapement.

Research on Atlantic salmon is directed at determining the causes of the precipitous decline in Atlantic salmon returning to Maine waters. Ongoing MASC research projects are aimed at determining survival among freshwater life stages and understanding the biological and environmental factors affecting survival. NOAA-Fisheries salmon research focuses on the same questions in estuarine and marine waters. The two agencies conduct cooperative research designed to link freshwater rearing conditions and smolt emigration to better understand the biotic and abiotic factors affecting the freshwater-marine transition. Components of the cooperative projects are currently underway on the Pleasant, Narraguagus, Dennys, and Penobscot Rivers. These include: parr density and growth, basin-wide estimates of large parr; indices or estimates of smolt emigration smolt; smolt physiology, marine and estuarine smolt trawling, and smolt tracking through estuaries. As part of this collaborative effort, MASC is working with the Senator George J. Mitchell Center for Environmental and Watershed Research at the University of Maine to monitor water quality within Downeast rivers. MASC is measuring cobble embedment in juvenile rearing habitat, and permeability in spawning habitat, to evaluate the relative quality of these across Maine salmon rivers. The water quality and habitat work are important background for further studies of over-winter parr survival and smolt physiology.

The Maine Atlantic Salmon Commission is also investigating the effects of physical habitat and hydrology on juvenile salmon survival. As part of this effort, MASC is working with U. S. Geological Service (USGS) to gage Atlantic salmon rivers and increase the data available to link hydrology, habitat, and juvenile production and survival. USGS is also conducting analyses of

historic data to determine if the timing and duration of summer and winter low flow periods has changed over the last century. The Maine Atlantic Salmon Commission, working with Kleinschmidt Energy and Water Resource Engineering of Pittsfield, Maine, and Sevee and Maher Engineers, Inc. of Cumberland Center, Maine recently completed (2005) a catalog of existing ground and surface water, geologic, habitat, and climatic data within these watersheds and an assessment of the potential surface-water and ground-water (SW-GW) watershed models. These models may prove valuable tools for assessing the effects of surface-water and groundwater withdrawals, and the land use/land cover changes on river flows, groundwater, and salmon habitat within portions of the rivers.

USGS Conte Anadromous Fish Research Lab completed three years (2002-2004) of field work on a collaborative project with MASC, PIN (Penobscot Indian Nation), NOAA-Fisheries, and the University of Maine, documenting the upstream migration of adult Atlantic salmon in the Penobscot River. The research used Passive Integrated Transponder (PIT) tag technology to gather data on movements of individual adult salmon that can be used to evaluate upstream movements and distribution of salmon within the drainage, the probability that fish are able to access spawning habitat, broodstock management, and the effectiveness of current juvenile stocking practices.

There are no comprehensive monitoring programs for the five diadromous fish SGCN, although limited monitoring does occur for striped bass, American shad, and Atlantic sturgeon. Monitoring for American shad occurs in river systems undergoing restoration (Saco, Androscoggin, and Kennebec Rivers). Maine is required to perform an annual spawning stock survey in the Saco and Androscoggin Rivers as a mandatory requirement of *Amendment 1 to the Interstate Fishery Management Plan for Shad & River Herring* (ASMFC, 1999) <http://www.asmfc.org/speciesDocuments/shad/fmps/shadam1.pdf>. Native populations of Atlantic sturgeon, shortnose sturgeon, and striped bass are only found in the larger river systems including the Kennebec, Androscoggin, and Penobscot Rivers.

A monitoring program for juvenile striped bass and American shad has been ongoing in the Kennebec and Androscoggin Rivers since 1978. Assessments of the population status of shortnose and Atlantic sturgeon have occurred in the Kennebec and Androscoggin River, and limited sampling occurred in the Penobscot River.

There are no ongoing monitoring programs for sturgeon. The management of Atlantic sturgeon is regulated through the Atlantic States Marine Fisheries Commission (ASMFC) under *Amendment 1 to the Interstate Fishery Management Plan for Atlantic Sturgeon* (ASMFC, 1998) <http://www.asmfc.org/speciesDocuments/sturgeon/fmps/fmps/sturgeonAm1.pdf>. It is recommended under this plan that at least every five years, each jurisdiction with reproducing populations of Atlantic sturgeon should survey juvenile abundance, calculate Catch Per Unit of Effort (CPUE) estimates of juveniles, and conduct tag and release programs of juveniles. In addition to recruitment parameters above, jurisdictions with spawning populations of Atlantic sturgeon should also commit, at least every five years, to examining sex ratio, and size and age structure by sex, of the larger subadults and adults.

Shortnose sturgeon are listed an Endangered Species and are managed under the jurisdiction of the National Marine Fisheries Commission. Recovery tasks are outlined in the Recovery Plan for the Shortnose Sturgeon (NMFS, 1998) <http://www.nmfs.noaa.gov/pr/readingrm/Recoverplans/snsplan.pdf>.

The management of American eels is regulated through the ASMFC under the Interstate Fishery Management Plan for American Eel (ASMFC, 2000). A mandatory requirement of the plan is that MDMR conduct an annual young-of-the-year survey.

Currently, there are no monitoring efforts for marine turtles in the State.

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Coastal Ecosystem																														
Marine Open Waters (CO)																														
American Shad																													X	
Atlantic Ridley																												X		
Atlantic Salmon																												X		
Atlantic Sturgeon																														
Finback Whale																											X			
Greater Shearwater																											X			
Humpback Whale																											X			
Leatherback																														
Loggerhead																														
Northern Right Whale																											X			
Red-necked Phalarope	X	X																												
Sei Whale																											X			
Sperm Whale																											X			
Striped Bass																													X	
Estuaries and Bays (CE)																														
American Black Duck (Wintering Population)	X	X	X											X																
Common Eider (Molting and Wintering Birds)	X	X	X						X					X																

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Common Loon (Wintering and Non-breeding)															X															
Greater Scaup (Non-breeding)	X	X	X											X																
Ruddy Duck	X	X	X											X																
Shortnose Sturgeon																														
Rocky Coastline and Islands (CC)																														
American Oystercatcher	X	X	X									R																		
Arctic Tern	X		X								X																			
Atlantic Puffin	X	X									X				X															
Bald Eagle	X	X	X						X						X															
Cattle Egret											X																			
Common Eider (Breeding Population Only)	X	X	X						X		X																			
Common Murre											X				X															
Common Tern	X		X								X				X															
Glossy Ibis											X																			
Great Cormorant	X										X																			
Great Egret											X																			
Harlequin Duck	X	X	X		X										X															

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Little Blue Heron											X																			
Penobscot Meadow Vole																														
Purple Sandpiper	X	X	X												X															
Razorbill	X	X									X				X															
Roseate Tern	X		X								X				X															
Ruddy Turnstone	X	X	X									R																		
Snowy Egret											X																			
Tri-colored Heron											X																			
Unconsolidated Shore (CU)																														
Great Blue Heron											X																			
Greater Yellowlegs	X	X	X									R																		
Least Tern	X	X													X															
Piping Plover	X	X	X												X															
Red Knot	X	X	X									R																		
Sanderling	X	X	X									R																		
Semipalmated Sandpiper	X	X	X									R																		
Whimbrel	X	X	X									R																		
Estuarine Emergent Salt Marsh (CS)																														
Black-crowned Night Heron											X																			

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Citrine Forktail <i>Ischnura hastata</i>																														
Nelson’s Sharp-tailed Sparrow	X	X	X																											
Saltmarsh Sharp-tailed Sparrow	X	X	X																											
Willet	X	X	X																											
Freshwater Ecosystem																														
Lakes and Ponds (WL)																														
American Eel	X	X	X													X	X	X	X	X	X		X				X			
Arctic Charr	X	X	X													X	X			X	X			X			X			
Barn Swallow	X	X		X																										
Big Bluet <i>Enallagma durum</i>																														
Bigmouth Pondsnail <i>Stagnicola mighelsi</i>																														
Bonaparte’s Gull (Breeding)																														
Brook Trout	X	X	X													X	X	X	X	X	X		X	X			X			
Burbot (Cusk)	X	X	X													X	X	X	X	X			X	X			X			
Common Loon (Breeding)								X	X						X															
Dusky Dancer <i>Argia translata</i>																														

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Great Lakes Physa <i>Physella magnalacustris</i>																														
Lake Trout (Togue)	X	X	X													X	X		X	X	X				X		X			
Lake Whitefish	X	X	X													X	X		X	X	X						X			
Landlocked Salmon	X	X	X													X	X	X	X	X	X			X			X			
Longnose Sucker	X	X	X																X	X										
A Mayfly <i>Siphonurus demaryi</i>																														
A Mayfly <i>Siphonurus securifer</i>																														
Pied-billed Grebe																														
Rainbow Smelt	X	X	X													X	X			X					X					
Rambur's Forktail <i>Ischnura ramburii</i>																														
Round Whitefish	X	X	X													X	X			X	X									
Scarlet Bluet <i>Enallagma pictum</i>																														
Spatterdock Darner <i>Rhionaeschna mutata</i>																														
Swamp Darter	X	X	X															X					X							
Tidewater Mucket <i>Leptodea ochracea</i>																														

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Tule Bluet <i>Enallagma carunculatum</i>																														
Emergent Marsh and Wet Meadows (WM)																														
American Bittern																														
American Black Duck (Breeding Population)	X	X	X										X																	
American Coot																														
Black Tern															X															
Common Moorhen																														
Least Bittern																														
Marsh Wren	X	X	X																											
Purple Martin	X	X																												
Sandhill Crane															X															
Sedge Darner <i>Aeshna juncea</i>																														
Sedge Wren																														
Yellow Rail																														
Forested Wetland (WF)																														
Hessel's Hairstreak <i>Callophrys hesseli</i>																														

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Precious Underwing <i>Catocala p. pretiosa</i>																														
Swamp Darner <i>Epiaeschna heros</i>																														
Shrub-scrub Wetlands (WS)																														
Blanding's Turtle	X	X																												
Blue-spotted Salamander	X	X	X																											
Ringed Boghaunter <i>Williamsonia lintneri</i>																														
Rusty Blackbird	X	X	X																											
Spotted Turtle	X	X																												
Willow Flycatcher	X	X	X	X																										
Peatlands (WP)																														
Canada Whiteface <i>Leucorrhinia patricia</i>																														
Clayton's Copper <i>Lycaena dorcas claytoni</i>	X	X	X																											
Crowberry Blue <i>Plebejus idas empetri</i>																														
Deep-Throat Vertigo <i>Vertigo nylanderi</i>																														

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Frigga Fritillary <i>Boloria frigga</i>																														
Pleistocene Catinella <i>Catinella exile</i>																														
Quebec Emerald <i>Somatochlora brevicincta</i>																														
Six-whorl Vertigo <i>Vertigo morsei</i>																														
Rivers and Streams (WR)																														
American Shad																													X	
Arrow Clubtail <i>Stylurus spiniceps</i>																														
Arrowhead Spiketail <i>Cordulegaster obliqua</i>																														
Atlantic Salmon																												X		
Atlantic Sturgeon																														
Barrow's Goldeneye	X	X	X												X															
Boreal Snaketail <i>Ophiogomphus colubrinus</i>																														
Brook Floater <i>Alasmidonta varicosa</i>																														

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys	
A Caddisfly <i>Hydroptila tomah</i>																															
Cobra Clubtail <i>Gomphus vastus</i>																															
Louisiana Waterthrush	X	X	X																												
A Mayfly <i>Baetisca rubescens</i>																															
A Mayfly <i>Nixe horrida</i>																															
A Mayfly <i>Nixe rusticalis</i>																															
A Mayfly <i>Plauditus veteris</i>																															
A Mayfly <i>Procloeon mendax</i>																															
A Mayfly <i>Procloeon ozburni</i>																															
A Mayfly <i>Procloeon simplex</i>																															
Pygmy Snaketail <i>Ophiogomphus howei</i>																															

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Rapids Clubtail <i>Gomphus quadricolor</i>																														
Roaring Brook Mayfly <i>Epeorus frisoni</i>																														
Redfin Pickerel	X	X	X													X		X					X							
Shortnose Sturgeon																							X							
Southern Pygmy Clubtail <i>Lanthus vernalis</i>																														
Striped Bass																													X	
A Spire Snail <i>Amnicola decusus</i>																														
A Stonefly <i>Neoperla mainensis</i>																														
Tomah Mayfly <i>Siphoniscia aerodromia</i>	X	X	X																											
Wood Turtle																														
Yellow Lampmussel <i>Lampsilis cariosa</i>																														
Yellow-throated Vireo	X	X	X																											
Upland Ecosystem																														
Deciduous and Mixed Forest (UD)																														

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
	American Burying Beetle <i>Nicrophorus americanus</i>																													
	Baltimore Oriole	X	X	X	X																									
	Black and White Warbler	X	X	X	X																									
	Black-billed Cuckoo				X																									
	Black-throated Blue Warbler	X	X	X	X																									
	Black-throated Green Warbler	X	X	X	X																									
	Canada Warbler	X	X	X																										
	Early Hairstreak <i>Erora laeta</i>																													
	Eastern Box Turtle	X																												
	Eastern Screech Owl																													
	Great-crested Flycatcher	X	X	X	X																									
	Lamellate Supercoil <i>Paravitrea lamellidens</i>																													
	Mystery Vertigo <i>Vertigo paradoxa</i>																													
	Northern Flicker				X																									
	Northern Parula	X	X	X	X																									
	Rose-breasted Grosbeak	X	X	X	X																									

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Scarlet Tanager	X	X	X	X																										
Spicebush Swallowtail <i>Papilio troilus</i>																														
Veery	X	X	X	X																										
Wood Thrush	X	X	X	X																										
Yellow-bellied Sapsucker				X																										
Coniferous Forest (UC)																														
American Three-toed Woodpecker																														
Barred Owl										X																				
Bay-breasted Warbler	X	X	X	X																										
Blackburnian Warbler	X	X	X	X																										
Cape May Warbler	X	X	X	X																										
Long-eared Owl																														
Olive-sided Flycatcher	X	X	X																											
Pine Devil <i>Citheronia sepulcralis</i>																														
Purple Finch	X	X	X	X	X	R																								
Purple Lesser Fritillary <i>Boloria chariclea grandis</i>																														
Red Crossbill	X	X	X		X																									

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Dry Woodland and Barrens (UB)																														
Barrens Itame <i>Itame sp. 1</i>																														
The Buckmoth <i>Hemileuca m. maia</i>																														
Edward's Hairstreak <i>Satyrrium edwardsii</i>																														
Graceful Clearwing <i>Hemaris gracilis</i>																														
A Moth <i>Cucullia speyeri</i>																														
A Moth <i>Nepytia pellucidaria</i>																														
A Noctuid Moth <i>Chaetaglaea cerata</i>																														
Northern Black Racer	X																													
Pine Barrens Zale <i>Zale sp. 1 nr. lunifera</i>																														
Pine Barrens Zanclognatha <i>Zanclognatha martha</i>																														

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Pine Pinion <i>Lithophane l. lepida</i>																														
Pink Sallow <i>Psectraglaea carnososa</i>																														
Prairie Warbler	X	X	X																											
Sleepy Duskywing <i>Erynnis brizo</i>																														
Twilight Moth <i>Lycia rachelae</i>																														
Upland Sandpiper	X																													
Vesper Sparrow	X	X	X	X																										
Mountaintop Forest (UM)																														
Bicknell's Thrush	X	X	X			R																								
Northern Bog Lemming																														
Alpine (UA)																														
American Pipit (Breeding)																														
Katahdin Arctic <i>Oeneis polixenes katahdin</i>																														
Shrub / Early Successional (US)																														
American Woodcock	X	X	X												X															
Blue-gray Gnatcatcher	X	X	X																											

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys
Blue-winged Warbler	X	X	X																											
Brown Thrasher	X	X	X	X																										
Canada Lynx															X															
Chestnut-sided Warbler	X	X	X	X																										
Common Nighthawk																														
Eastern Kingbird	X	X	X	X																										
Eastern Towhee	X	X	X	X																										
Loggerhead Shrike	X	X	X																											
New England Cottontail	X																													
Whip-poor-will																														
Wolf															X															
Grassland / Agriculture / Old Fields (UG)																														
Bobolink	X	X	X	X																										
Cobweb Skipper <i>Hesperia metea</i>																														
Coral Hairstreak <i>Satyrium titus</i>																														
Eastern Meadowlark	X	X	X	X																										
Field Sparrow	X	X	X	X																										
Grasshopper Sparrow	X						X																							

Table 44. Status of Population Monitoring of Maine's Species of Greatest Conservation Need.

Habitat / Species	Assessment	Goals and Objectives	Management System	Breeding Bird Survey	Christmas Bird Count	Mountain Birdwatch	Kennebunk Plains / TNC Annual Survey	Maine Audubon Annual Loon Count	Maine Coastal Waterbird Survey	Maine Owl Survey	Maine Colonial Waterbird Survey	Migratory Shorebird Survey (PRISM)	Waterfowl Brood Counts	Mid-winter Waterfowl Survey	Species Specific Surveys & Monitoring	Clerk Creel Census	Voluntary Creel Census	Stream Electro Fishing	Lake Electro Fishing	Gill Netting	Trap Netting	Minnow Traps / Pots	Beach Seins	Fishway Traps	Trawling	SCUBA / Snorkeling	Experimental Angling	Voluntary Sightings Network	Monitoring Salmon Traps & Lifts	Spawning Stock Surveys	
Greenish Blue <i>Plebejus saepiolus amica</i>																															
Horned Lark (Breeding)	X	X	X																												
Juniper Hairstreak <i>Callophrys gryneus</i>																															
Leonard's Skipper <i>Hesperia leonardus</i>																															
Short-eared Owl																															
Urban/Suburban (UU)																															
Chimney Swift				X																											
Cliff Face and Rocky Outcrop (UR)																															
Eastern Small-footed Myotis																															
Golden Eagle	X	X													X																
Peregrine Falcon	X	X													X																
Timber Rattlesnake																															
Caves and Mines (UCM)																															
X = State-level Monitoring R = Regional-level Monitoring																															

7.2 MONITORING SPECIES-SPECIFIC HABITAT CONSERVATION

Like Maine's strategy to monitor SGCN species-specific conservation, Maine's strategy for monitoring species-specific habitat conservation for Maine's SGCN species is based on our species planning process (Chapter 6.2.1, Box 9 of Figure 17). Nearly all species-specific (or group of species) management goals and objectives developed through the species planning process include habitat management goals and objectives that have been established through the public working group process (Chapter 6.2.1, Box 9 of Figure 17). Each management system contains a component that addresses how we will reach habitat goals and objectives established for a species (or a group of species), how we will monitor our progress toward the goals and objectives, and identifies adaptive management measures that will be implemented under various scenarios. The management system for Grassland Passerines (Hodgman 2005) is provided as an example of how a management system works (Appendix 11).

Several management objectives were established for grassland Passerines, including two habitat objectives.

Habitat Objective 1: Identify all priority grassland habitats in Maine and improve habitat quality at 50% of these sites by 2007.

Habitat Objective 2: By 2017, improve management practices to enhance grassland bird populations on at least 100 additional grassland sites.

To address these two objectives, a section of the *Grassland Passerine Management System* focuses on habitat management, which the following is an excerpt.

HABITAT MANAGEMENT SYSTEM

Decision Criteria

The following criteria determine the sequence of procedures used to conserve habitat for grassland Passerines in Maine (Fig. 2).

Criterion E1: *Has a system been developed to prioritize individual grasslands with regard to their importance to grassland Passerines?*

This criterion evaluates which factors should be considered when determining which grasslands should be the focus of agency efforts. A review of the literature pertaining to habitat selection of priority grassland Passerines (and E/T grassland species as well), and the ongoing efforts by Habitat Group to identify these, will be the source of information to answer this criterion. An affirmative response will require that this review has been completed.

Criterion E2: *Have all priority grasslands been identified?*

This criterion evaluates whether the above prioritization scheme has been used and if individual sites have been identified and their locations mapped. Status of the Habitat Group's Grassland Project will be the source of information to answer this criterion.

An affirmative response will occur when a summary document listing the locations of each priority grassland is available and GIS coverage of their locations has been developed.

Criterion E3: *Has habitat for grassland Passerines been improved at 50% of the priority sites?*

This criterion addresses whether management actions to improve habitat at ½ of the sites has been accomplished.

An affirmative response will be achieved when management actions at >50% of the listed priority grasslands has been initiated.

Criterion F1: *Have an additional 100 grassland sites been identified for management?*

This criterion addresses whether, in addition to the priority sites, 100 other sites have been identified for potential improvement in management to benefit grassland Passerines.

An affirmative response will require a list of 100 sites, their location, and landowner contact information.

Criterion F2: *Are the effects of various grassland management practices on populations of grassland Passerines in Maine well understood?*

This criterion addresses whether agency staff understand the relative importance of various grassland management practices on the persistence and productivity (via either actual nest success data or indices of reproduction) of grassland Passerines. A review of the scientific literature and consultation with experts, as well as results of our own investigations, will form the basis to evaluate this criterion.

An affirmative response can be made when a summary document describing and comparing various management practices affecting grassland Passerines has been reviewed (if outside our agency) or drafted (if done by our own staff).

Criterion F3: *Have management practices on these 100 sites been altered to improve conditions for grassland Passerines?*

This criterion addresses whether steps have been taken to alter land management activities to benefit grassland Passerines. A list of past and present land management practices for each of the 100 sites forms the basis for evaluating this criterion.

An affirmative response can be made when a summary table has been developed for each site that describes, in detail, which steps have been taken to improve habitat at the site for grassland Passerines.

Management Actions

The following management actions are the recommended procedures for accomplishing habitat objectives. Specific management actions result from responses to decision criteria identified in Figure 2.

Management Action VI

1. Conduct literature review on habitat requirements for all priority grassland Passerines.
2. Prepare list of key habitat characteristics that should be used in a ranking scheme.
3. Compare results of literature review with information available from Habitat Group project.
4. Review data from IFW Grassland Bird survey to determine sites with greatest abundance and diversity.
5. Review Heritage database for occurrences of E/T grassland species.
6. Develop ranking system based on above information.

Management Action VII

1. Create list of sites and generate priority ranks based on scheme described in Management Action VI.
2. Create database of priority Grassland sites that includes the following fields:
 - Priority Score
 - Site Name.
 - Town(s).
 - Landowner information (if available)
 - Type of grassland
 - Management practices
 - Grassland species present
 - Element occurrences for E/T grassland species
 - Comments
3. Create GIS coverage of all priority sites.

Management Action VIII

1. Use database of priority sites to review current management practices at all sites.
2. Identify sites (50% of total number of priority sites) where habitat management, if altered, would benefit grassland Passerines.
3. Contact regional biologists and/or landowner regarding willingness to alter current management.
4. Meet with NRCS staff to explore whether management at some sites could be funded in part by WHIP.

Management Action IX

1. Identify 100 additional sites using the following sources:

- Any sites with occurrences of E/T grassland species not included in the “50% of priority sites.”
 - Sites that met a priority score threshold, but were not included in the 50% targeted for management action.
 - Sites that have low priority score, but have landowners willing to participate.
 - State-owned properties that would be easy to manage
 - Sites already enrolled in WHIP, but that may need slight alterations over time.
2. Create database of 100 additional Grassland sites that includes the following fields:
- Site Name.
 - Town(s).
 - Landowner information (if available)
 - Type of grassland
 - Current Management practices
 - Grassland species present
 - Element occurrences for E/T grassland species
 - Comments

MANAGEMENT ACTION X

1. Conduct literature review on grassland management practices and habitat quality for all priority grassland Passerines.
2. Identify significant gaps in knowledge and potential consequences.
3. Conduct additional research as needed to fill gaps in knowledge.

MANAGEMENT ACTION XI

1. Implement alterations to grassland habitat management (following guidelines in Management Action X) on as many sites as possible.
2. Add to database described in Management Action IX the following fields:
 - Alterations to current management
 - Dates for each
 - Area effected
 - Landowner perception of benefit to Grassland Birds.
 - Associated costs
 - Sources of funding.

Management Action XII - Reconvene public working group and redraft habitat objective.

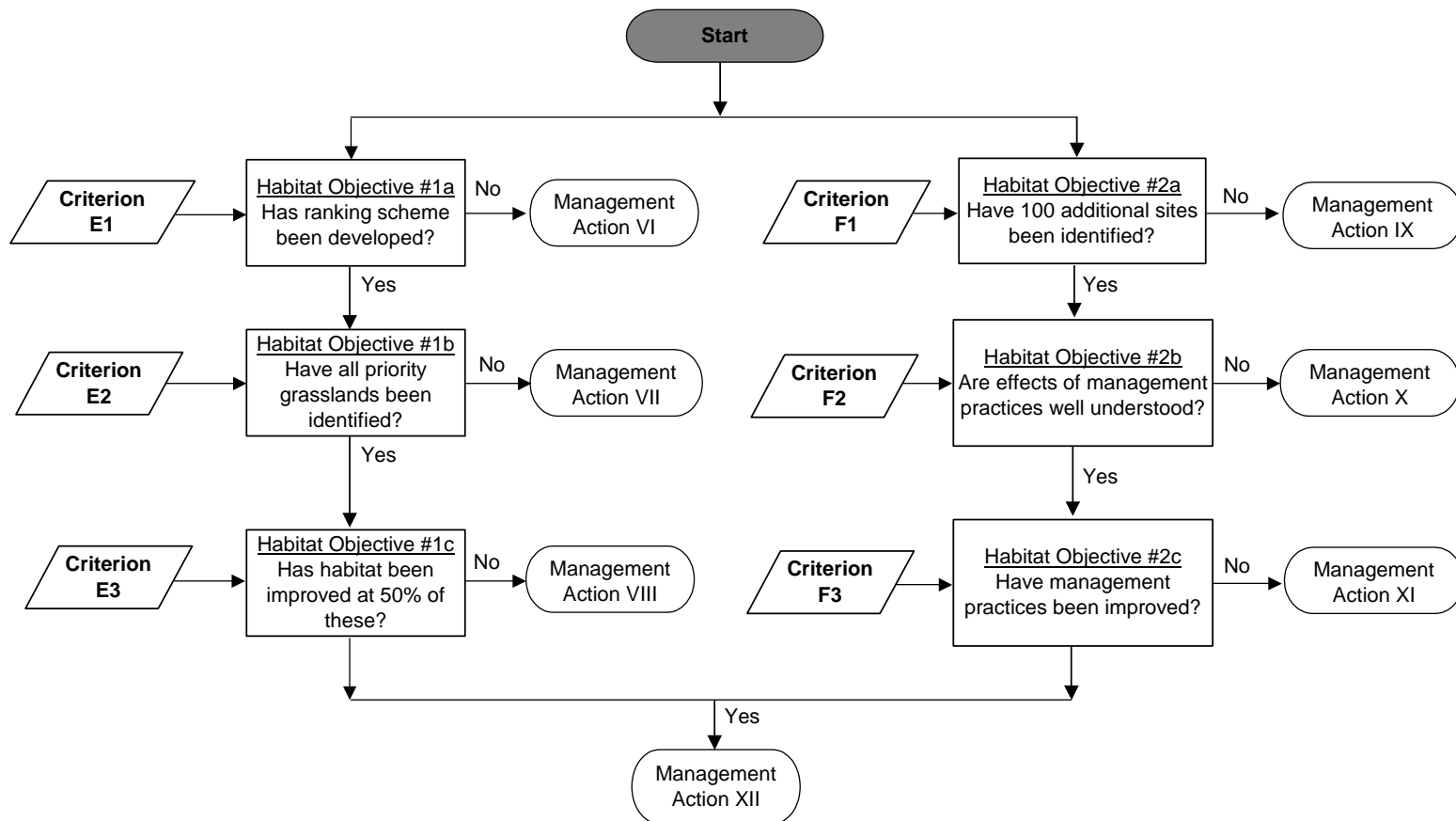


Figure 2. Flow diagram depicting decision criteria for Habitat Management System for grassland Passerines in Maine.

The ultimate goal is to include all SGCN species under the umbrella of a management system that will monitor progress toward specific habitat conservation goals and objectives. As mentioned earlier in this chapter, there are 90 SGCN species for which species assessments have been written, 84 of them have habitat conservation goals and objectives derived by a public working group, and 72 of them are covered by a management system (Tables 40, 41 and 44). We will place a high priority to fully implement current management systems, and complete management systems for all species for which there are assessments. For the details of how we will accomplish this, please refer to the previous section, *7.1 Monitoring SGCN Species-specific Population Conservation*, at the beginning of this chapter.

7.3 MONITORING LANDSCAPE HABITAT CONSERVATION

This last section of this chapter addresses how we will monitor landscape level conservation efforts for SGCN, the foundation upon which Maine's CWCS is built. Supported on that foundation are two conservation pillars: 1) species-specific conservation, and 2) species-specific habitat conservation discussed in Sections 7.1 and 7.2 respectively. In this section, we first examine monitoring the success of specific landscape level habitat conservation efforts (Table 45), and then present how we will monitor statewide landscape changes.

7.3.1 MONITORING LANDSCAPE CONSERVATION ACTIONS

You will recall from earlier discussions, Maine's CWCS is built on a foundation of landscape habitat conservation (*Beginning with Habitat*), which is designed to ensure that adequate habitat remains available in perpetuity to support not only Maine's SGCN, but the full array of wildlife occurring in Maine. In Tables 30-35 (Chapter 5.0) and Table 37 (Chapter 6.1), we identify several landscape level habitat conservation strategies and the tools we will use to address those strategies. Our primary tool is *Beginning with Habitat* (Chapter 6.2.2 and Appendix 12), but a number of other tools were identified that play important roles in ensuring the integrity of our landscape conservation foundation. Some tools will be, or are being, implemented within *Beginning with Habitat*; others are independent of *Beginning with Habitat*, but nevertheless work in concert with *Beginning with Habitat* and help fulfill the program's mission. How we will monitor the success of our landscape conservation strategies, and the tools used to implement those strategies, are summarized in Table 45.

7.3.2 MONITORING STATEWIDE HABITAT CHANGES

Satellite Imagery

Existing, statewide land cover information for Maine is based on Landsat Thematic Mapper (TM) 30-meter resolution data from 1991 and 1993. These data were developed as part of the *Maine Gap Analysis* (Krohn et al. 1998), which demonstrated a variety of uses for these kinds of land cover data, and identified the need to periodically repeat land cover mapping to monitor environmental quality and change.

In 2004, a multi-agency effort within the State of Maine combined resources and awarded a contract to update Maine's land cover data. The update will use the 1991 and 1993, 30-meter data from Landsat with 2004, 5-meter spot imagery based on 5-meter resolution data and a modified Maine Gap Analysis classification scheme. Another major product of the update will be

a map of imperviousness based on 2004, 5-meter Spot imagery. The map will primarily cover the southern part of the state, and will serve as an indication of development in Maine. Our goal is to build a commitment among Maine's state agencies to update Maine's land cover data every 5 years, so we can monitor statewide habitat changes and development.

Forest Inventory

In 1995, the USDA Forest Service and the Maine Forest Service or the Maine Department of Conservation, completed a full forest inventory in Maine. These same partners instituted an annual inventory in 1999 that measures 20% of a statewide sample of Maine's forests every year (Laustsen et al. 2003). The inventory is structured so that annual inventories (dataset panels) can be aggregated to provide a moving average of the most recent 5-years of data. These summaries provide estimates of forest area; species, number, and size of trees; volume; and components of change. These data have proven invaluable when developing species assessments and habitat models, and will be used for monitoring the health of Maine's forests for SGCN species. <http://www.fs.fed.us/ne/fia/states/me/ME5yr.html>.

Farmland Changes

Changes in the amount of farmland and its uses will be monitored via updated satellite imagery and forest inventory data mentioned above, and via updates to the U.S. Department of Agriculture (USDA) agriculture census data (USDA 2004, <http://www.nass.usda.gov/census/>).

Table 45. Monitoring Landscape Habitat Conservation Actions in Maine.	
General Habitat Conservation Strategy	Monitoring Strategy
Implement landscape level habitat conservation initiatives.	<p>Beginning with Habitat (BwH) - (described at length in Chapter 6.2.2) embodies a fundamental change in the way that state and federal agencies in Maine approach wildlife habitat conservation. It is a habitat-based model that provides the information to cooperatively create a landscape with local decision-makers in organized towns that will secure Maine's outdoor legacy. The <i>Beginning with Habitat</i> Steering Committee is currently in the process of developing a strategic plan for the program that contains measurable objectives and performance measures to monitor delivery, utilization, and effectiveness of Beginning with Habitat materials and principles in creating a landscape that conserves all of Maine's wildlife. Though not complete, we will monitor BwH by the following:</p> <p><u>Outreach</u></p> <ul style="list-style-type: none"> • Number of towns and regions mapped. • Number of towns, land trusts, and regional planning groups receiving BwH presentations. • Ease of access to up-to-date habitat data for all user groups (government agencies, towns, conservation groups, and individuals). • Development of functional, accessible BwH Internet Map Server. • Number of successful regional planning efforts completed. • Percentage of multi-town land use planning efforts incorporating BwH data and concepts. • Number of towns receiving in-depth assistance with implementation of BwH principles. • Number of towns achieving measurable progress in implementing BwH principles (through creation of land use or open space plans, ordinance revision, or other actions). • Number and quality of case studies highlighting good examples of local implementation of BwH principles. • Availability of current lists of people that town officials can contact for advice on local implementation of BwH. • Development of outreach strategy for implementing landscape-scale habitat planning in the unorganized townships of Maine. <p><u>Incentives</u></p> <ul style="list-style-type: none"> • Number of towns with access to technical assistance on habitat planning from a BwH biologist. • Number of newly conserved acres in identified BwH Focus Areas. • Number of acres in identified BwH Focus Areas in "Tree Growth" or "Farm and Open Space" current use tax programs. • Successful creation of new incentives for towns and landowners to conserve priority habitat. <p><u>Broad Utilization, Integration, and Leverage</u></p> <ul style="list-style-type: none"> • Degree of integration of BwH Focus Areas and principles into statewide land conservation and incentive programs. <p>Landowner Incentive Program (LIP) The Landowner Incentive Program is a competitive grant program that supports collaborative efforts to partner with private landowners to cultivate and fund conservation opportunities for critical habitats in the state. –The State of Maine was awarded \$1.3 million and \$655,000 grants from the U.S. Fish and Wildlife Service in 2004 and 2005 respectively to implement a Landowner Incentive Program. The Department of Inland Fisheries and Wildlife provides administrative oversight of Maine's LIP program, and the Maine Natural Areas</p>

Table 45. Monitoring Landscape Habitat Conservation Actions in Maine.	
General Habitat Conservation Strategy	Monitoring Strategy
	<p>Program provides LIP outreach. A Steering Committee, comprised of state and federal agencies and conservation partners, is responsible for generating competitive criteria for distributing LIP funds fairly and equitably, delivery of technical and financial assistance to landowners, administrative and coordination functions, and establishing goals and measurable objectives for the conservation of Maine's species-at-risk and their habitats.</p> <p>LIP provides financial incentives to private landowners in return for longterm habitat protection for rare and endangered species. In Maine, the program has five objectives:</p> <ol style="list-style-type: none"> 1. Bald Eagle Nesting Habitat 2. Least Tern and Piping Plover Nesting Habitat 3. Furbish Lousewort Habitat Protection 4. Restoring Seabird Nesting Habitat on Stratton Island 5. Species At-risk Focus Areas in Southern and Coastal Maine <p>Performance objectives to monitor LIP activities include:</p> <ul style="list-style-type: none"> • Number of landowners with bald eagle nests on their property receiving <i>Living with Eagles</i> guide. • Number of priority bald eagle nest sites in permanent or long-term protection. • Number of pairs of piping plovers and least terns nesting on beaches with effective nest site management. • Number of landowners with piping plover or least tern nesting areas near their property receiving <i>Living with Plovers</i> guide. • Number of landowners entering into long-term management agreements to benefit nesting piping plovers and least terns. • Area of dunes restored and protected near piping plover/least tern nesting habitat. • Number of at-risk seabirds breeding on Stratton Island. • Number of acres of at-risk rare plant and animal habitat and rare and exemplary Natural Communities permanently protected through the use of conservation easements. • Number of at-risk species benefiting from permanent habitat conservation. • Number of landowners educated about species-at-risk Focus Areas and related management recommendations and conservation options.
Develop regulatory habitat protection provisions for projects under the Maine Endangered Species Act (MESA) and other regulations protecting Maine's wildlife [e.g. Natural Resources Protection Act (NRPA), Site Location Law].	<p>Essential Habitats (EH) – Allows the commissioner of MDIFW to identify areas currently or historically providing physical or biological features essential to the conservation of an endangered or threatened species and which may require special management consideration. Examples of areas that could qualify for designation are nest sites or important feeding areas. For some species, protection of these kinds of habitats is vital to preventing further decline or achieving recovery goals. The commissioner may also develop guidelines for the protection of species designated as endangered or threatened. In addition, no projects may be carried out which will significantly alter the habitat...(or) violate protection guidelines set forth. For this habitat conservation regulation for Maine's E&T species, we will annually monitor the following:</p> <ul style="list-style-type: none"> • Number of acres of E&T species habitats protected under EH. • Number of new areas designated as Essential Habitats. • Number of EH reviews.

Table 45. Monitoring Landscape Habitat Conservation Actions in Maine.	
General Habitat Conservation Strategy	Monitoring Strategy
	<ul style="list-style-type: none"> Number of permits denied as a result of Essential Habitat. <p>Significant Wildlife Habitats (SWH) – Significant Wildlife Habitats are one of several protected resources under the Natural Resources Protection Act (NRPA), which regulates dredging, bulldozing, removing or displacing soil, sand, vegetation or other materials; draining or otherwise dewatering; filling, including adding sand or other material to a sand dune; or any construction, repair or alteration of any permanent structure as per 38 MRSA Section 480-A-S. NRPA applies to all "protected resources", which in addition to SWH include: coastal sand dune systems, coastal wetlands, fragile mountain areas, freshwater wetlands, great ponds or rivers, streams or brooks as defined. For this regulation designated for specific groups of species under NRPA, we will annually monitor the following:</p> <ul style="list-style-type: none"> Number of SGCN covered under SWH designation. Numbers of environmental permit reviews involving SWH and SGCN. Number of projects permitted and denied under SWH/NRPA. <p>Site Location Law – requires review of developments that may have a substantial effect upon the environment. These types of development have been identified by the Legislature, and include developments such as projects occupying more than 20 acres, metallic mineral and advanced exploration projects, large structures and subdivisions, and oil terminal facilities. A permit is issued if the project meets applicable standards addressing areas such as stormwater management, groundwater protection, infrastructure, wildlife and fisheries, noise, and unusual natural areas. For this environmental protection regulation, we will develop a means of monitoring the following:</p> <ul style="list-style-type: none"> Number of permits reviewed involving SGCN. Number of permits applications involving SGCN that are approved and denied. <p>Shoreland Zoning – Regulates activities within 250 feet, horizontal distance, of the normal high-water line of any great pond, river or saltwater body; within 250 feet, horizontal distance, of the upland edge of a coastal wetland or freshwater wetland; and within 75 feet, horizontal distance, of the normal high-water line of a stream. Also applies to any structure built on, over or abutting a dock, wharf or pier, or other structure extending beyond the normal high-water line of a water body or within a wetland. 38 MRSA Section 438-A(1). Encourage Maine Department of Environmental Protection to annually monitor the following:</p> <ul style="list-style-type: none"> Number of towns that implement shoreland zoning in town ordinances. Number of towns that enforce those ordinances.
Develop consistent regulatory habitat protection standards for projects subject to review under the MESA and NRPA.	<p>Essential Habitats – Annually monitor:</p> <ul style="list-style-type: none"> Interspecific review standards to ensure consistency in application of Essential Habitat regulations. All project reviews under Essential Habitat by species to ensure review standards are being applied consistently statewide. <p>Significant Wildlife Habitats – Periodically monitor (at least every five years), all Significant Wildlife regulations for interspecific consistency, and consistent intraspecific application.</p>
Support enforcement of existing environmental laws to protect key habitats.	Monitor the percent of cases where Essential Habitat, Significant Wildlife Habitats, Site Locations laws, and Shoreland Zoning have been violated in respect to fish and wildlife protection, and the offending parties have been prosecuted.

Table 45. Monitoring Landscape Habitat Conservation Actions in Maine.	
General Habitat Conservation Strategy	Monitoring Strategy
Develop non-regulatory habitat management guidelines for priority habitats and species for distribution to landowners, land managers, towns, land trusts, and others.	Annually monitor: <ul style="list-style-type: none"> • The number of SGCN for which habitat management guidelines are developed and published. • The number of landowners, land managers, towns, land trusts, and others that receive habitat management guidelines. • The number of landowners, etc. that implement habitat management according to the guidelines.
Cooperate with TNC, NRCS, FSM, landowners, local land trusts, municipalities, and other partners to conserve habitat for priority species using fee acquisition, conservation easements, purchase of development rights, incentives, cooperative management agreements, management plans, improved comprehensive planning, habitat restoration and enhancements, and other conservation tools.	This is an extremely important aspect of Maine's efforts to conserve habitats for SGCN. It involves federal, state, municipalities, land trusts, NGOs, landowners, and individuals, some of which is accomplished under the umbrella of BwH. To monitor the success of these efforts collectively, we will develop a way to annually monitor the number of acres under habitat conservation through: <ul style="list-style-type: none"> • Fee acquisition, • Conservation easement, • Purchase of development rights, • Cooperative management agreements, and • Management plans,
Identify existing and potential threats to habitats for priority species and consider restorative measures to improve habitat integrity.	These types of actions are, and will be driven primarily through the species planning process (Chapter 6.2.1, Figure 17).
Develop and monitor the implementation of specific conservation actions.	These types of actions are driven by the species planning process (Chapter 6.2.1, Figure 17).